TELECOMMUNICATION TERMINAL HAVING CHARACTER RECOGNITION

Field Of The Invention

The present invention relates to a telecommunication terminal having data input devices.

Background Information

Telecommunication terminals, especially mobile telephones, are generally known, which carry keys, in particular alphanumeric keyboards, on their housing surfaces.

Summary Of The Invention

The telecommunication terminal according to the present invention has the advantage, as opposed to these, that data for controlling the telecommunication terminal can be input using pressure sensor elements, and this partially eliminates the need for keys for data input. This makes possible a smaller type of construction of the telecommunication terminal. Furthermore, costs are reduced by the saving in keys for data input and the production effort is simplified. In addition, this reduces the weight of the telecommunication terminal.

It is particularly advantageous that a character recognition unit is provided, especially for recognition of alphanumeric characters, which makes possible the input of any message characters at all in cooperation with the pressure sensor elements.

It is also an advantage that the telecommunication terminal includes a transmitting device via which signals can be transmitted in dependence on signaling information. This makes possible characters adapted to a user's writing habits and a logging of characters input into the telecommunication terminal by a writing process.

It is also of advantage that the telecommunication terminal includes reproduction and confirmation facilities. This makes characters, input by way of the pressure sensor element and the character recognition unit, correctable, and a user can limit himself in the correction of input data, by correcting, for instance, only a character input in error.

A further advantage is that the pressure receiving element is formed as a writing tip, so that during a writing process the input is automatic.

It is a still further advantage that input and operating functions of the telecommunication terminal can be activated in dependence on signaling information, particularly menu-controlled. This makes possible a simple and intuitive use of all functionalities of the telecommunication terminal.

Furthermore, it is advantageous that a memory mode can be activated, in dependence upon the input signaling information, which is provided for entering, for instance, telephone book or notebook entries into a memory of the telecommunication terminal. This yields advantageous additional utilization possibilities of this telecommunication terminal, particularly as address book and/or appointment diary.

It is also of advantage to provide a calculating mode, whereby the telecommunication terminal becomes usable for carrying out calculating operations.

Beyond that, it is of advantage to provide an alarm mode which can be activated and operated, so that the telecommunication terminal can be used as an alarm clock.

Finally, it is advantageous to provide a data interface, especially an infrared interface, in the telecommunication terminal, whereby data can be exchanged, for instance, with other telecommunication terminals or even a data processing installation.

Brief Description Of The Drawings

Figure 1 shows a block diagram of a telecommunication terminal.

Figure 2 shows an illustration in perspective of the telecommunication terminal.

Figure 3 shows a top view of a second specific embodiment of a pressure receiving element.

Figure 4 shows a side view of the second specific embodiment of the pressure receiving element along section A-B of Figure 3.

Figure 5 shows a flow diagram of character recognition.

Figure 6 shows a block diagram of a character recognition unit.

Detailed Description

Figure 1 shows a block diagram of a telecommunication terminal 10. The telecommunication terminal 10 can be designed cord-dependent or cordless. A design for a cordless telecommunication terminal can be for a mobile telephone, a cordless telephone or the like. The telecommunication terminal 10 includes data input devices 140 and reproduction devices 120, both connected to a control device 190. The telecommunication terminal 10 also includes a transmitting device 160 and a receiving device 180, which are also both connected to a controlling device 190. In one advantageous specific embodiment of the telecommunication terminal 10 a data interface is provided, which permits the exchange of data between the telecommunication terminal 10 and a further unit, such as a second telecommunication terminal 10 or even a data processing installation. The data interface is not shown expressly, but the transmitting device 160 includes the subsection of the data interface for transmitting data, and the receiving device 180 includes the subsection of the data interface for receiving data. A memory 192 is assigned to the control device.

In Figure 2 the telecommunication terminal 10 is shown in perspective. The

telecommunication terminal 10 includes a housing 100 and a pressure sensor element 220. In this exemplary embodiment the telecommunication terminal 10 includes a first pressure sensor element 201, a second pressure sensor element 202 and a third pressure sensor element 203. Movements carried out with the telecommunication terminal 10 on a surface, wherein the pressure receiving element 220 touches the surface at least intermittently, can be detected by the pressure sensor elements 201, 202, 203. In this connection, the pressure receiving element 220 transmits the forces exerted by the surface to the pressure sensor elements 201, 202, 203. The pressure sensor elements 201, 202, 203 are particularly positioned in such a way that the pressure receiving element 220 transmits at any one time a component of the movement to one of the pressure sensor elements 201, 202, 203. For example, the first pressure sensor element 201 and the second sensor element 202 are poaitioned at the side of pressure receiving element 220, rotated from each other by about 90^0, and the third pressure sensor element 203 is positioned at a first end of the pressure receiving element 220. Thereby, movements on a surface, such as on a sheet of paper, are detected in such a way that a movement of the telecommunication terminal 10 in a first movement direction on the surface is detectable either exclusively by the first pressure sensor element 201 or, in a first circumstance, by the first and the second pressure sensor element 201, 202, and that a movement of the telecommunication terminal 10 in a second movement direction, which is rotated with respect to the first movement direction by an angle, in particular of 90^0, is detectable either exclusively by the second pressure sensor element 202 or, in a second circumstance, by the first and the second pressure sensor elements 201, 202. A pressing of the telecommunication terminal 10 upon the surface is detectable by the third pressure sensor element 203.

Figure 2 illustrates in exemplary fashion a first specific embodiment of the pressure receiving element 220. A second end of the pressure receiving element 220, lying opposite to the first end, is designed as a writing tip 222, for instance, in the form of a ballpoint tip or the like, and this makes it possible to note down the movements the telecommunication terminal 10 makes in, for instance, drawing a picture on the surface. A written character is then visible on the surface, particularly on a paper surface or the like, which makes possible a secure and checked data input. In an advantageous specific embodiment of the telecommunication terminal 10, the pressure receiving element 220 includes a reservoir, in particular for

accommodating printing ink or the like. By way of the receptacle 224 the pressure receiving element 220 is locked in place in the housing 100 of the telecommunication terminal 10. At a second end of the pressure receiving element 220, the pressure sensor elements 201, 202, 203 pick up the forces impinging upon the writing tip 222 and transmitted by the pressure receiving element 220. In an exemplary embodiment, the telecommunication terminal 10 is formed, for instance as a ballpoint pen, pencil, or the like. The pressure receiving element can be made of a refill, particularly for ballpoint pens, feltpoint pens and the like, having a tip which fulfills the function of the writing tip 222, The input of data via the pressure sensor elements 201, 202, 203 into the telecommunication terminal 10 takes place, according to the exemplary description of the specific embodiment, by the user's holding the telecommunication terminal 10 as if writing with a ballpoint pen, and as if writing characters on a paper surface or the like. The movements, which the telecommunication terminal executes by writing on the surface, are detected and used for data input in the manner described. It is thus possible to control the telecommunication transmitting device 10 by writing directly memorable control orders, such as, "Call 12345", "Telephone book Peter: 1234511," "Call Peter", or the like.

The reproduction devices 120 include an indicator element 122, such as an LCD display, and a receiver inset 124. The input devices 140 include confirmation devices 142, especially keys, and a microphone 144.

The reproduction devices 120 and the input devices 140 are particularly positioned in such a way that easy and simple operation of the telecommunication terminal 10 is possible, on the one hand with regard to the data input into the telecommunication terminal 10 by way of character recognition, and on the other hand with regard to other utilization possibilities of the telecommunication terminal 10, such as telecommunication. For this purpose, in the exemplary embodiment, the confirmation devices 142 are installed in a region between the pressure receiving element 220 and the display element 122, so that they can be easily used by the user for correcting data input. Furthermore, the microphone 144 in the exemplary embodiment is positioned in the region of the pressure receiving element 220, and the receiver inset 124 is positioned at the opposite end of the telecommunication terminal 10, so that use of the telecommunication terminal 10 as a telephone is made easier, because the

mouth and ear of the user can easily be brought into the vicinity of the corresponding input and reproduction devices.

In Figure 3 the telecommunication terminal is shown in a top view, and in Figure 4 in a sectional illustration along the sectional line AB in Figure 3. The pressure receiving element 221 is designed in Figures 3 and 4 in a second specific embodiment as a sphere. A second specific embodiment of the mounting 225 locks in place the pressure receiving element 221 in housing 100. In case of a movement of the telecommunication terminal 10 on a surface, in which the pressure receiving element 221 touches the surface, the surface has a dynamic effect on the pressure receiving element 221 which is passed on by the pressure receiving element 221 to the pressure sensor elements 201, 202, 203. The positioning of pressure sensor elements 201, 202, 203 has the effect that each of them receives the force or the pressure data which belong to a component of the movement, similar to what was described in the light of Figure 2.

The telecommunication terminal 10 is not necessarily formed like a ballpoint pen or in the shape of a pencil. For example, a telecommunication terminal 10 can also be provided in the form of a mobile telephone (Handy), in which the pressure receiving element 220, 221 is positioned particularly at one corner, curve or the like, of the mobile telephone. The pressure receiving element 220, 221 can, for example be designed to be extendable so that the writing fluid can only exit from the pressure receiving element 220, 221 during data input into the telecommunication terminal 10 by way of the pressure sensor elements 201, 202, 203. But the pressure receiving element 220, 221 can also be positioned in a fixed way, and designed either open on the telecommunication terminal 10 or covered by a covering device.

Figure 5 represents a flow diagram for character recognition in the telecommunication terminal 10. The dynamic effects brought about on the pressure receiving element 220, 221 by the movements of the telecommunication terminal 10 on the surface are transmitted from the pressure receiving element 220, 221 to the pressure sensor elements 201, 202, 203. The pressure sensor elements 201, 202, 203 transduce the force data 500 into signals 520, in particular electrical signals. The pressure sensor elements 201, 202, 203, which are connected to a character recognition unit 240, conduct the signals 520 further on to the character

recognition unit 240, which converts the signals 520 into character data 550.

Figure 6 is a block diagram illustrating conversion of the signal information 520 into character data 550. The character recognition unit 240 includes a digital-analog conversion unit 241, which is connected to a central unit 244. Both a standardizing unit 242 and a recognition unit 243 are connected to the central unit. The central unit 244 is also connected to the confirmation devices 142.

After the execution of a movement of the telecommunication terminal 10 on the surface, the signals 520, received by the character recognition unit 240, are first digitized in the analog-digital conversion unit 241, whereby first data are produced. The standardizing unit 242 contains second data corresponding to the characters to be recognized, and which are compared with the first data in the recognition unit 243, wherein a most probable first character is selected from a set of possible first characters, in dependence on the signal information 520. The most probable first character is made available as character data 550 by the character recognition unit 240 to the control unit 190 of the telecommunication terminal 10.

In an advantageous further development of the telecommunication terminal 10, the second data are changeable or open-ended, so that, on the one hand, first characters from the set of possible first characters can be substituted by freely selectable first characters and/or, on the other hand, freely selectable first characters can be added to the set of possible first characters.

By use of the confirmation devices 142 it is possible to have an influence on the recognition of the first characters in the recognition unit 243. Using a first correction feature, an erroneously recognized first character can be replaced by a second character from the set of possible first characters. Using a second correction feature, a completely new third character, that is to be recognized, can be input, if necessary, after repeated but fruitless use of the first correction feature, by executing a movement on the surface which corresponds to the third character, using the telecommunication terminal.

The signaling information 550 recognized by the character recognition unit 240 is conducted to the control unit 190 for controlling the telecommunication terminal 10.

In dependence upon the signaling information 550, the control unit activates the reproduction devices 120, the transmitting device 160 and/or the receiving device 180. In Figure 2 the display element 122 and the receiver inset 124 are described as examples of optical or acoustical reproduction devices 120, respectively Alternatively or in addition, reproduction devices 120 can be provided whose reproduction effect is made accessible to the user by sense of touch, and which can thus be viewed as haptic reproduction devices 120, in particular vibration devices for signaling such as incoming telephone calls.

After activation of the reproduction devices 120 by the control unit 190, the first data are reproducible which are generated in dependence on second, third or fourth data, the second data being generated by the input devices 140 and include, in particular, the signaling information; the third data being stored in memory 192; and the fourth data being received by receiving device 180.

For checking the correctness of the signaling information 550 by the user, the signaling information 550 can be displayed on the display element 122. In the same way, results of calculating operations can be displayed on the display element 122. Third data are displayed on the display element 122, especially stored telephone book data, address book data, appointment diary data and/or notebook data. Fourth data, in particular received short messages, e.g. SMS small messages, are displayed on the display element 122. Acoustical signals can be made audible by the receiver inset 124, for correcting, for example, the data input by movements of the telecommunication terminal 10 on a surface.

Furthermore, the receiver inset 124 can make audible (items) not only in dependence upon third data, such as for remembering stored appointments and/or alarm clock times, but also in dependence upon fourth data, such as for signaling an incoming telephone call. Beyond that, data can be reproduced in combined form on a plurality of reproduction devices 120. For example, the reminder of an appointment can be made audible on the receiver inset 124, and simultaneously place and subject content of the appointment can be displayed on the display

element 122.

Following activation of the transmitting device 160 by control unit 190, fifth data are transmitted in dependence upon second data, especially signaling information 550, upon third data and/or upon fourth data. In dependence upon signaling information 550, for example, ringing signals can be dispatched to a second telecommunication terminal, which may, for instance, initiate a telephone conversation, or signal the transmission of a short message to the participant. Fifth data can also be transmitted in dependence on third data. A telephone call can, for instance, be transmitted to the second telecommunication terminal at a previously stored point in time. In dependence on fourth data, for example control data received for transmission of a brief message which were received by the second telecommunications terminal, fifth data can be transmitted to a third telecommunications terminal.

In another advantageous specific embodiment of the telecommunication terminal 10, the memory 192 assigned to control unit 190 has contents for the menu-driven control of the telecommunication terminal 10, particularly data on various menu points and their pertaining control commands. Menu contents and their representation on the reproduction devices 120, particularly on the display element 122, can be provided permanently stored and invariable and/or programmable and changeable. Changing, replacing or adding to menu items can be done in dependence upon second data, particularly signaling information 550 or in dependence upon fourth data.

In a further advantageous specific embodiment of the telecommunication terminal 10, the transmitting unit 160 and the receiving unit 180 are designed in such a way that wireless communication, particularly according to the GSM standard, can be operated. The telecommunication terminal 10 can be operated especially for voice communication and/or for exchanging short messages, in particular, SMS messages.

In yet another further advantageous specific embodiment of the telecommunication terminal 10, the memory 192, assigned to control unit 190, includes storage capacity for occupancy by the personal data of a user, especially address book data, telephone book data, appointment data and/or notebook data.

In a further advantageous specific embodiment, the telecommunication terminal 10 includes a calculating unit assigned to the control unit 190, with which calculating operations can be carried out in a calculating mode of the telecommunication terminal 10.

In still another further improvement, the telecommunications terminal 10 includes a clock which acts together with the memory 192, assigned to the control unit 190, in such a way that functions of the telecommunication terminal 10 can be activated in dependence upon third data at predetermined points in time, such as stored appointment times or alarm clock times.